

REMARKS

The Examiner's Office Action has been thoroughly considered. In the Office Action, Examiner Coleman has rejected independent Claims 21 and 26, and dependent Claims 22 through 25 and 27 through 32, under 35 U.S.C. § 102(b), as being anticipated by Applicants' Admitted Prior Art, including FIGS. 1-3, hereinafter referred to as AAPA. By way of the amendments and remarks herein, Applicants believe their application to be in condition for allowance.

The Examiner points to the AAPA for teaching each step recited in Applicants' claims. With respect to Claim 21, for example, Applicants understand that Examiner Coleman believes the AAPA to teach the step of forming at least two conductive posts (citing conductive posts 150) overlying the semiconductor region (referring to layers 10-80) to form a structure. Thereafter, the Examiner suggests that the step of encapsulating (citing encapsulant layer 130) the structure and at least one of the two conductive posts is taught by the AAPA. Finally, the Examiner concludes that the AAPA teaches the step of exposing the at least one of the least two conductive posts (citing conductive posts 150).

Applicants respectfully traverse the Examiner's rejection of their claims. Applicants respectfully submit that their invention, as presently claimed, is neither taught nor suggested by the art of record, including the AAPA. Applicants submit the hereinabove amended claims to clarify the distinctions between their invention and the known art, including the AAPA.

On page 4 of the specification of their application, Applicants state the following shortcomings with the AAPA:

In the constant attempt to fabricate smaller III-V devices, it appears that the known art is limited to certain applications where the ability to finely dry etch via holes is not critical. Dry etching vias has proven effective for fabricating DHBTs having an emitter dimensions in the range of at least  $2 \times 4 \mu\text{m}$  to  $3 \times 5 \mu\text{m}$ . However, while the above known process for fabricating a III-V DHBT may provide for smaller device construction, dry etching vias for a transistor having an emitter of less than  $2 \times 4 \mu\text{m}$  has proven difficult. At these dimensions, the dry etched vias are difficult to define using lithography. This is particularly relevant with respect to the base and emitter vias because of the intended smaller device size. Presently, in view of the drive for smaller devices, a commercial interest exists for a DHBT device with an emitter contact dimension of at least  $1.2 \times 3 \mu\text{m}$ , as well as a base and emitter contact spacing of less than  $1 \mu\text{m}$ .

As a result, a method of manufacturing a DHBT is needed that will enable smaller device dimensions. Similarly, there is a demand for a process of fabricating a DHBT that is independent of dry etching vias to gain access to the base, emitter and collector contacts.

In view of the above, Applicants recognized that the limitations in dry etching via holes for an exemplary transistor having an emitter of less than  $2 \times 4 \mu\text{m}$ . Consequently, Applicants claimed invention, unlike the known art, such as AAPA, does not require forming a via hole through an encapsulated layer. Moreover, Applicants' claimed invention does not fill a formed via hole with a conductive material to create a plug.

To emphasize this distinction, Applicants direct the Examiner's attention to their claims as amended. Applicants' independent Claim 21 recites the step of "...forming at least two conductive posts...", while Applicants' independent Claim 26 recites the step of "...forming at least two conductive posts of about the same height...." Applicants' conductive posts in each independent claim are formed prior to their recited step of encapsulating ( "...encapsulating the structure ... to form a planarized cured passivation layer..."). This is in direct contrast to AAPA, which forms the aforementioned conductive plugs **only after** (1) the structure is encapsulated **and** (2) the via holes are formed through the encapsulated structure. Therefore, AAPA does not anticipate Applicants' claimed invention.

Moreover, in independent Claim 21, Applicants thereafter recite the step of "...exposing the at least one of the at least two conductive posts *protrudingly* through the planarized cured passivation layer to form the semiconductor device." Similarly, in independent Claim 26 Applicants thereafter recite the step of "...exposing the at least two conductive posts *protrudingly* through the planarized cured passivation layer to form the semiconductor device." These recited exposing steps are in direct contrast to AAPA because there is no teaching of Applicants' exposing step. More particularly, the aforementioned conductive plugs of the AAPA are formed by filling their corresponding via holes through the encapsulated structure. Applicants' conductive posts are formed prior to their recited step of exposing, and as a consequence of the exposing step, protrude through the planarized cured passivation layer. In contrast, AAPA fails to teach or

suggest an exposing step causing conductive plugs to protrude through a planarized cured passivation layer as a consequence. Thusly, AAPA does not anticipate Applicants' claimed invention.

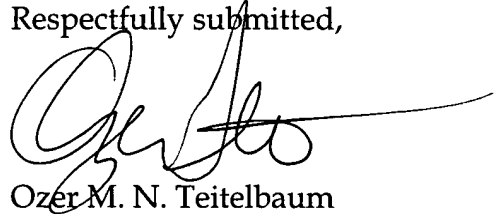
In view of the hereinabove distinctions, Applicants advance that the art of record, including AAPA does not teach their claims, as amended. Moreover, Applicants contend that the art of record, including AAPA, fails to the solve problem addressed by Applicants' invention – namely, the limitations in dry etching via holes for an exemplary transistor having an emitter of less than  $2 \times 4 \mu\text{m}$ . AAPA in fact promotes etching via holes through a planarized cured passivation layer. Therefore, Applicants submit that the art of record, including AAPA, fails to suggest the Applicants' claimed invention. Consequently, Applicants submit that their independent Claims 21 and 26 are novel, non-obvious and in allowable form.

By way of this amendment, Applicants have entered new claims. Applicants have inserted new Claim 33, dependent from independent Claim 21, and new Claim 34, dependent from independent Claim 21. Moreover, Applicants have entered new independent Claim 35, and new Claims 36 and 37, depending from Claim 35. New Claims 33 through 37 are neither taught nor suggested by the art of record, including AAPA. Consequently, Claims 33 through 37 are novel and non-obvious and in allowable form.

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Applicants believe that a full and complete response has been made to Examiner Dang's Office Action. Thus, in view of the hereinabove remarks, Applicants respectfully request reconsideration and allowance of their patent application and its claims. To that end, if the Examiner feels that a conference might expedite the prosecution of this case, he is cordially invited to call the undersigned.

Respectfully submitted,



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